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Abstract: Floodplains are well-distinguished and unique landscape features within river corridors that are often characterized as district flat areas. Identifying floodplain areas is important for understanding both flood risk to humans and hydro-ecologic processes. Several hydrogeomorphic DEM-based floodplain delineation algorithms have been developed in the last decade that are useful for delineating floodplains in large, ungauged basins. However, the lack of calibration and validation datasets constitutes a challenge for hydrogeomorphic floodplain modellers that need to carefully evaluate optimal model parametrization before applying floodplain modelling at large scales. In this work, a hydrogeomorphic floodplain mapping algorithm is used to evaluate the sensitivity of floodplain delineation results to DEM resolution, model scaling parameters, and location within a river network. The model is evaluated using the Italian Arno river basin as case study. Floodplain areas from the hydrogeomorphic model are compared to standard flood hazard maps in the Italian Arno basin as well as other simplified geomorphic floodplain mapping methods. Results show that the calibration of the model can be restricted to one scaling parameter due to linear dependency of the parameters. In addition, smaller optimal values for the scaling parameters are associated with higher stream orders in a river network. This work shows the impacts of parametrization on the model performances, paving the way for a larger scale analyses of floodplain delineation models..

***Keywords**:* Floodplain mapping, DEM resolution, Stream orders